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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BOBISH, CHRISTOPHER S

ART UNIT

PAPER NUMBER

3746

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/531,207	<b>Applicant(s)</b> ISHIKAWA ET AL.	
	<b>Examiner</b> CHRISTOPHER BOBISH	<b>Art Unit</b> 3746	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 August 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 15, 16 and 18-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15, 16 and 18-27 is/are rejected.
- 7) ☒ Claim(s) 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

The amendments filed on 04/23/2010 are insufficient to overcome the Takabayashi, Takatoshi, Sugiyama and Fukuda references.

Claims 15-16 and 18-27 are pending.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15 and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takabayashi (US Patent No. 4,741,978) in view of Takatoshi et al (EP 1 235 340 A2, as in the IDS) in view of Sugiyama (US Patent No. 4,968,338) in view of Fukuda et al (US PGPub No. 2001/0026429) in view of King (US Patent No. 5,589,743).

Takabayashi teaches:

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limitations from claim 15, a hydrogen operated power system, comprising: a supply system which supplies a gaseous fuel from a fuel supply tank, **C. 2 Lines 31-34**, to a hydrogen operated power source, **FIG. 2 (1) C. 2 Line 27**; and a pump, **FIG. 2 (5) C. 2 Line 34**, provided in the supply system, which is driven by a motor, **FIG. 2 (6) C. 2 Line 36**; and an abnormality detecting portion, **FIG. 1 (25, 26) C. 3 Lines 20-46**, which detects a plurality of types of different abnormalities related to currents (overcurrent) driving the motor;

Takabayashi teaches a motor without mentioning a sensor, however Takatoshi specifically teaches the need for a pump motor to be constructed without sensors:

limitations from claim 15, a pump **(7)** and a sensor-less motor **(8)** for driving said pump, **C. 2 paragraphs [0008, 0009]** and **C. 6 paragraphs [0042, 0045]**;

**It would have been obvious to one having ordinary skill in the art of pump/motor systems at the time of the invention to provide a sensor-less motor as taught by Takatoshi to drive the pump taught by Takabayashi in order to increase the motor durability due to the lack of any fragile sensors.**

Neither Takabayashi nor Takatoshi teaches a counting of abnormalities to determine an abnormality, but Sugiyama does.

Sugiyama teaches:

limitations from claim 15, wherein a pump **(1)** and a pump motor **(1a)** are controlled by an abnormality detecting portion **(12)**; wherein said detecting portion counts up an inclusive number of the plurality of types of detected abnormalities **(via 12a)**, regardless of type, compares the number of the detected abnormalities with a predetermined number of times, and determines that an abnormality has occurred in the supply system when the number of the detected abnormalities reaches the predetermined number of times **(C. 5 Line 26 to C. 6 Line 5)**, after an instruction has been given to start the motor until a predetermined period of time has passed, the predetermined number being larger than one; Sugiyama further teaches that the abnormality is detected at a power line **(from source 20)** leading to an inverter **(6c)** of the motor **(1a)** **(see C. 4 Lines 56-68)**

**It would have been obvious to one of ordinary skill in the art of pump/motor systems at the time of the invention to provide a counting and comparing operation as taught by Sugiyama in the system as taught by Takabayashi**

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**and modified by Takatoshi in order to avoid erroneous detections and motor shutdown, resulting in continuous driving of the motor.**

Neither Takabayashi nor Takatoshi nor Sugiyama teaches detecting overcurrent after an inverter section, but King does.

King teaches:

limitations from claim 15, wherein a motor **(42)** has a power line running through an inverter **(34)**, and the inverter is protected from overcurrent abnormalities by sensors **(38, 40)** located in circuits after the inverter section but before the motor **(FIG. 1 and C. 3 Lines 25-51)**;

**It would have been obvious to one of ordinary skill in the art of pump/motor systems at the time of the invention to detect overcurrent at different locations in the pump system taught by Takabayashi and modified by Takatoshi and Sugiyama, including a circuitry section before the motor as taught by King, in order to protect multiple components of the system from damage (C. 3 Lines 39-41 of King).**

In regards to the limitation that different types of abnormalities are to be detected by the detecting portion, the examiner believes that monitoring overcurrent as taught by Takabayashi and Sugiyama would meet the limitation.

Fukuda teaches that overcurrent can be detected to signal multiple abnormalities related to motor driving current (short circuit, rotor lock...) (paragraphs 0053, 0157 and 0160);

Takabayashi, Takatoshi, Fukuda, Sugiyama and King disclose and teach of the power system in claim 15.

Sugiyama further teaches:

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limitations from claim 23, a system stopping portion which stops the system when the abnormality determining portion determines that the abnormality has occurred in the supply system (**C. 5 Line 26 to C. 6 Line 5**);

limitations from claims 22 and 24, a restart instructing portion instructing a system to restart when an abnormality has been detected by the abnormality detecting portion, and stopping the system when the restart portion determines there is an abnormality, **C. 5 Lines 42-54, C. 6 Lines 19-25**;

limitations from claim 25, wherein the abnormality detecting portion detects, as one of the plurality of abnormalities, at least one of an **over-current abnormality** in the motor, a short-circuit current abnormality in an element in the motor, and a lock abnormality in the motor, **C. 5 Lines 29-32**;

Takabayashi, Takatoshi, Fukuda, Sugiyama and King disclose and teach of the power system in claim 15.

Sugiyama further teaches:

limitations from claim 26, wherein the hydrogen operated power source **(1)** is a fuel cell, **C. 2 Line 26**;

Claims 16, 18, 20, 21 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takabayashi (US Patent No. 4,741,978) in view of Takatoshi et al (EP 1 235 340 A2, as in the IDS) in view of Sugiyama (US Patent No. 4,968,338) in view of Fukuda et al (US PGPub No. 2001/0026429) in view of King (US Patent No. 5,589,743) as applied to claim 15 above, and in further view of Nonobe et al (USPGPUB No. 2002/0094467 A1).

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Takabayashi, Takatoshi, Fukuda, Sugiyama and King disclose and teach of the power system in claim 15.

Nonobe teaches:

limitations from claim 16, a hydrogen operated power system, comprising: a supply system which supplies a gaseous fuel from a fuel supply tank, **FIG. 4 (300) ¶ 80**, to a hydrogen operated power source, **FIG. 4 (100) ¶ 26 and 75**; and a pump; and an abnormality detecting portion which detects a plurality of types of different abnormalities related to driving a motor, **¶ 72-73 and 81**; wherein a supply system circulates the gaseous fuel supplied from the fuel supply tank **(300)** to the hydrogen operated power source **(100)** via a circulation path, **FIG. 4 (401, 403) ¶ 80**, so as to supply the gaseous fuel to the hydrogen operated power source, and the pump **(410)** circulates the gaseous fuel in the circulation path, **¶ 85**;

limitations from claim 18, wherein a supply system is provided with a check valve, **FIG. 4 (426) ¶ 80**, mounted on a discharge side of the pump **(410)**, and the abnormality determining portion **(as taught by Sugiyama)** determines sticking of the check valve to be an abnormality in the supply system, **¶ 72 discusses the failure of a valve (404) to be a detectable abnormality in the system, and while this is not the check valve immediately at the discharge side of the pump, examiner believes that the malfunction of the check valve (426) would cause similar pressure changes and it would have been obvious to one having ordinary skill in the art to monitor this valve for failure as well or in place of the other valve (404)**;

limitations from claim 20, further comprising a pressure detecting portion which detects a pressure on the discharge side of the pump, and the abnormality determining portion determines whether the check valve is stuck based on the pressure detected by the pressure detecting portion, **the upper half of ¶ 72 teaches a valve failure leading to a detectable pressure change in the system, the substitution of different abnormalities to monitor the system is considered by the examiner to be a routine skill to one of ordinary skill in the art**;

limitations from claim 21, further comprising a system stopping portion which stops the system when it has been determined by the abnormality determining portion that there is an abnormality in the check valve, **¶ 72-73**;

limitations from claim 27, wherein the hydrogen operated power system is used in a hydrogen engine, **¶ 3 - ¶ 5**.

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**It would have been obvious to one of ordinary skill in the art of hydrogen systems at the time of the invention to provide a pressure relief valve in the system taught by Takabayashi and modified by Takatoshi, Sugiyama, Fukuda and King, as taught by Nonobe in order to avoid damage to the fuel cell caused by high pressures.**

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takabayashi (US Patent No. 4,741,978) in view of Takatoshi et al (EP 1 235 340 A2, as in the IDS) in view of Sugiyama (US Patent No. 4,968,338) in view of Fukuda et al (US PGPub No. 2001/0026429) in view of King (US Patent No. 5,589,743) in view of Nonobe et al (USPGPUB No. 2002/0094467 A1) as applied to claims 15 and 18 above, and in further view of Ferguson et al (US Patent No 6,463,949 B2).

Nonobe, Takabayashi, Takatoshi, Fukuda, Sugiyama and King teach and disclose of the power system of claim 18.

Ferguson further teaches:

limitations from claim 19, further comprising an outside air temperature detecting portion which detects an outside air temperature, and the abnormality determining portion determines whether the check valve is stuck based on the outside air temperature detected by the outside air temperature detecting portion, **C. 1 Lines 18-23 of Ferguson teach that temperature of a fluid can be monitored in order to detect an abnormality in a valve, it would have been obvious to one having ordinary skill in the art of fuel pump systems to monitor the temperature outside of the system alternatively, as is known in the art of fuel systems, to monitor a valve;**



Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takabayashi (US Patent No. 4,741,978) in view of Takatoshi et al (EP 1 235 340 A2, as in the IDS) in view of Sugiyama (US Patent No. 4,968,338) in view of Fukuda et al (US PGPub No. 2001/0026429) in view of King (US Patent No. 5,589,743) in view of Nonobe et al (USPGPUB No. 2002/0094467 A1) as applied to claims 15 and 18 above, and in further view of Ferguson et al (US Patent No 6,463,949 B2) in view of Sugawara et al (US Patent No 7,279,242 B2).

Nonobe, Takabayashi, Takatoshi, Fukuda, Sugiyama and King teach and disclose of the pump of claims 15 and 18.

Neither Nonobe nor Takatoshi nor Fukuda nor Sugiyama teach of monitoring an outside air temperature; Ferguson teaches monitoring a temperature of fluid inside the system, to check a valve status.

Sugawara teaches a section to monitor an outside air temperature of a system to control a valve.

limitations from claim 19, further comprising an outside air temperature detecting portion which detects an outside air temperature, **C. 6 Lines 52-63**;

**It would have been obvious to one having ordinary skill in the art of pump/valve systems at the time of the invention to combine the temperature sensing system of Sugawara with the power system taught by Nonobe and modified by Takatoshi, Sugiyama, Fukuda and King in order to prevent system damage by running a pump/motor while an abnormality in the system exists. Furthermore, one of ordinary skill in the art would be able to conclude from Sugawara that an abnormal change in temperature measured would be related to the function of a valve.**

***Allowable Subject Matter***

Claim 28 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

Applicant's arguments with respect to claim 15 have been considered but are moot in view of the new ground(s) of rejection.

The applicant has amended claim 15 to recite limitations regarding the location of the sensed abnormalities in the pump system of the invention. The locations are at a point before current/power enters into an inverter and also at a point after the current/power has entered the inverter. The examiner has responded by amending the portion of the rejection relying on Sugiyama to include language directing applicant to portions of the Sugiyama disclosure that teach overcurrent monitoring prior to an inverter element. King has been relied upon to further teach that an inverter itself can be protected by monitoring overcurrent after the inverter element. The change in location, or addition of locations of the overcurrent detecting sensors would be obvious to one of ordinary skill in the art in order to protect different areas/elements of the pump system.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER BOBISH whose telephone number is (571)270-5289. The examiner can normally be reached on Monday through Thursday, 7:30 - 6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571)272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher Bobish/  
Examiner, Art Unit 3746

/Devon C Kramer/  
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